

THE MYCOPHILE

VOLUME 46:4

JULY / AUGUST 2005

WWW.NAMYCO.ORG

Psst . . . Let's talk smut today

by Else C. Vellinga

Smut—1. A fungus disease affecting various plants, esp. cereals, which are spoiled by the grain being wholly or partly converted into a blackish powder; also, one or other of the fungi (species of *Ustilagineæ*) causing the disease. 2. A black mark or stain; a smudge. 3. Bad, soft, earthy coal. 4. Soot or sooty matter. 5. Indecent or obscene language. (*Oxford English Dictionary*, online version)

Let's talk infectious diseases: let's talk huitlacoche, and blisters of black spores, and sex—sure, sex is involved as well.

Ah yes, huitlacoche is a smut, by some considered a pest, by many others a delicacy; it is also a perfect lab "animal," and its complete genome has been sequenced.

Common Smut, Corn or Boil Smut, huitlacoche and cuitlacoche,

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Nancy Mladenoff: Portrait of a Mushroom Artist

by Britt Bunyard

You may have first encountered the art of Nancy Mladenoff at the 2005 NAMA Annual Foray. Nancy was a Photo Contest winner for digital entries of artwork.

Actually, her art isn't photography, but painting, and her canvas is . . . well, the mushroom itself. In case you're uninitiated, Nancy Mladenoff paints on mushrooms. Of course, she paints on canvas, too—beautifully, I must add. But her painted mushrooms are definitely most striking.

I recently caught up with the artist at her place of work. Nancy Mladenoff is an art professor at the University of Wisconsin-Madison. Besides her obvious passion and talent for art, she has a number of other interests. A quick glance

around her studio reveals that mushrooms are a near-obsession for her: photographs of painted mushrooms, photographs of cultivated mushrooms, painted canvases with abstract images of mushrooms (and insects), as well as painted upholstery fabrics.

Mushrooms have long been a subject of art. Throughout history they have been depicted with bright and unnatural colors or shapes, by numerous cultures. Of course, most often this has been to reflect the psychoactive properties utilized by various societies, including our own. When I first saw one of Nancy's painted mushrooms—it was the one with the sort of tie-dyed cap—I had a hard time figuring out what was going on in the image.

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PRESIDENT'S MESSAGE

Well, the morels came. From what I've been reading, there was an abundance of morels showing up in most areas of the U.S. Finally a spring with moisture—and well-timed moisture. Lots of other things are showing up now too here in the Southeast. I'm even finding a variety of boletes already (mid May).

Again, if you haven't registered for the Wisconsin foray in July, don't wait too long. I'm not sure how many spaces are still available, but they'll be disappearing quickly. At this time airfares have dropped, so take advantage of it.

NAMA has received an exceptional gift. Marcia Guravich, the widow of Dan Guravich, has generously donated to NAMA Dan's complete library of fungi photography. Many of us have seen Dan's beautiful photographs in numerous field guides and articles over the years. The collection consists of 5,117 slides, organized, cataloged, and preserved in archival sleeves. NAMA's officers and trustees will be determining how this incredible library can best be utilized for the benefits of the organization and its members. If you know Marcia, please take the time to thank her for this extremely valuable gift.

What do you enjoy about wild mushrooms? That was a question asked of me lately by an Associated Press national writer. After what turned out to be probably a two-page email in response, I had to come to the question, "What is not to enjoy about wild mushrooms?" We all have an interesting story, I'm sure, of why we started hunting wild mushrooms or became interested in mycology as a profession. Since we're still doing it, I assume that we are enjoying it. I'm sure that she didn't expect a two-page reply to this question, but my list of things I enjoy about wild mushrooms was extensive. Not the least of which is that there are many good mushrooms to be found by walking into and out of trout streams.

I hope we all have an enjoyable mushroom season. See you in Wisconsin. —*Ike*



Nancy Mladenoff's photos of her paintings appear courtesy of the artist.

Moving?

Please send your new address, **two weeks** before you move, to

Ann Bornstein
NAMA Membership Secretary
336 Lenox Avenue
Oakland, CA 94610-4675
<Membership@namyco.org>

Otherwise—you may not be getting your newsletter for a while. Each issue, several *Mycophiles* are returned as undeliverable because of no forwarding address on file. NAMA is charged **seventy cents** for each returned or forwarded newsletter.

NAMA is a 501(c)(3) charitable organization. Contributions to support the scientific and educational activities of the Association are always welcome and may be deductible as allowed by law. Gifts of any amount may be made for special occasions, such as birthdays, anniversaries, and for memorials.

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The Mycophile is published bimonthly by the North American Mycological Association, 6615 Tudor Court, Gladstone, OR 97027-1032.

NAMA is a nonprofit corporation; contributions may be tax-deductible.

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**Eagle Hill Field Seminars
Steuben, Maine**

July 10–16, July 17–23,
Aug. 28–Sept. 3

For details see the May/June '05 issue of *THE MYCOPHILE* or their Web site at www.eaglehill.us or email them at office@eaglehill.us .

**Three Courses for
Mycophiles
Delta Institute of Natural
History, Bowdoin, Maine
July 16–18, Aug. 7, Sept. 23-25**

For details see the May/June '05 issue of *THE MYCOPHILE* or to register, contact Delta Institute of Natural History, 219 Dead River Road, Bowdoin, ME 04287; www.vfthomas.com/deltahome.htm; or phone (207) 266-5748.

**NAMA Annual Foray
University of Wisconsin–
La Crosse
July 21–24**

Details can be found in the Mar./Apr. and May/June '05 issues of *THE MYCOPHILE* or from the NAMA Web site; application form is on pages 13–14 in this issue. Don't forget: our Host Mycologist, Tom Volk, has requested that those arriving early please respect the area and not collect within 20 miles of La Crosse. See you there!

**Three Exotic Mexican Forays
Copper Canyon
July 24–31**

Tlaxcala
Aug. 28–Sept. 4

Veracruz
Oct. 16–23

For details see the Mar./Apr. '05 issue of *THE MYCOPHILE* or contact the tour organizers, Erik and Gundi, at gundi@mexmush.com , or visit www.mexmush.com.

**Mycological Society of
America/Mycological Society
of Japan Joint Meeting
University of Hawaii–Hilo**

July 30–Aug. 5

For details see the May/June '05 issue of *THE MYCOPHILE* or contact fungus@hawaii.edu or visit the MSA Web site www.msafungi.org.

**11th Annual NEMF Samuel
Ristich Foray
Aug. 11–14**

For details see the May/June '05 *MYCOPHILE*; for registration form and additional information email the registrars John or Cheryl Dawson at nemf2005@suscom.net > or call them at (717) 846-1225.

**25th Anniversary of the
Telluride Mushroom Festival
Telluride, Colorado
Aug. 18–21**

For details see the May/June '05 issue of *THE MYCOPHILE*. Complete information about the Festival program, registration, lodging, and travel is available on the Festival's Web site: www.shroomfestival.com, or write Fungophile, Attn. Mushroom Festival, P.O. Box 480503, Denver, CO 80248-0503, or call Emanuel Salzman, M.D., at (303) 296-9359 or (303) 296-1524.

**28th Clark Rogerson Foray
Moodus, Connecticut
Aug. 25–28**

The foray will be held at Cave Hill Resort, in Moodus, CT. Foray experts will include Gary Lincoff, Roz Lowen, Sam Ristich, Sandy Sheine, and Leon Shernoff. For details see the Mar./Apr. '05 issue of *The Mycophile* or contact Don Shernoff at (914) 761-0332 or donshernoff@yahoo.com > .

**Alaska's Wild Mushrooms
Aug. 26–28**

This foray will be held at "Across-the-Bay Tent and Breakfast," across Kachemak Bay from Homer and on Kasitsna Bay. Price of foray includes rustic, cozy accommodations, delicious meals, a wood-fired sauna, and scenic surroundings.

Explore the hemlock and spruce forests of the Kenai Peninsula for wild mushrooms with Alaska mushroom enthusiast Chris Riggio. Price: \$280.00 plus tax (includes water transportation from Homer, accommodations, meals, and foray).

Add an extra day to the workshop for a sea kayak trip, mountain-biking, or hiking (additional charge will apply). Foray limit is 17. Contact owners Mary Jane and Tony Lastufka at (907) 235-3633 or 345-2571, e-mail ecotour@ptialaska.net > or visit their Web site at www.tentandbreakfastalaska.com for more information.

**Foray Newfoundland and
Labrador 2005
Gros Morne National Park,
Newfoundland
Sept. 2–5**

**Labrador Straits
Sept. 6–9**

For details see the May/June '05 issue of *THE MYCOPHILE* or check the Humber Natural History Society Web site: www.swgc.mun.ca/hnhs.

**Annual Gary Lincoff Mid-
Atlantic Mushroom Foray
Sept. 10**

For details see the May/June '05 issue of *THE MYCOPHILE* or contact the WPMC or Dick Dougall at (412) 486-7504, or by email rsdme@imap.pitt.edu > ; or Glenn Carr at (412) 369-0495 or by email gbrown2carrs@cs.com > .

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Letter to the Editor: Poisoning

The item on page 4 in the March/April 2005 issue of *THE MYCOPHILE*, about the *Amanita phalloides* fatality in the San Francisco Bay Area, caught my eye. I'm curious about where the figure of "900 cases of mushroom poisoning reported in California last year" came from. I can't be sure of the source, but I suspect it is from the American Association of Poison Control Centers' TESS 2003 or 2004 report. If so, I'd like to point out that those figures refer to "mushroom exposures," not just symptomatic cases ("poisonings").

In the Rocky Mountain Poison and Drug Center's area (Colorado, Idaho, Montana, Las Vegas, Nevada, and Hawaii), and, I'm reasonably sure, in the rest of the country, this includes essentially all contacts concerning mushrooms, including such calls as, "My child may have touched a mushroom. Is it poisonous?" This type of call probably accounts for a very large percentage of those 900 cases. Typically, most of those cases would have ended with no symptoms ever occurring, and the identity of the mushroom being listed as "unknown."

The count of mushroom exposures for our RMPDC territory in the past has been about 500 a year (I haven't checked that figure recently). Each year, from our multi-state area, I receive, on average, between 75 and 100 calls for mushroom identification, and of those, perhaps 35 to 70 will be symptomatic.

Nationally, there has sometimes been concern that the number of identified mushrooms in those thousands of "exposures" is so low. However, we know that the vast majority of those exposures involve common non-toxic mushrooms, and it would be a full-time job and then some to identify all. Add to that the difficulty of having people get specimens to one of the relatively small number of identifiers, if indeed specimens are available, and it boggles the mind!

Many poison centers, working with their mycology consultants, have established guidelines on when to call for identification. Since treatment is based on symptoms, and we don't want to treat if it is not necessary, many of those cases are handled on an observation and follow-up basis. This system has worked very well in the vast majority of mushroom exposures.

—Marilyn Shaw

Mycology Consultant to Rocky Mountain Poison
and Drug Center

Member, NAMA Toxicology Committee
Chair, CO Mycological Society Toxicology Committee

PS: To Bill Freedman and Mike Wood: I trust you would agree with my suspicion that this "900 poisonings in California" figure does not represent actual poisonings, but rather "exposures." —Marilyn

Forays and Announcements, continued from page 3

Priest Lake (ID) Foray

Sept. 23–25

The Spokane Mushroom Club's annual Priest Lake Foray will take place at Hill's Resort in beautiful Priest Lake, Idaho. The Spokane Mushroom Club recently celebrated its 40th birthday and would like to invite all who are interested to help celebrate. For details contact Doris Distad at <dstad@juno.com> or (509) 328-7973 or visit our web site at www.spokanemushroomclub.org.

Wildacres Regional NAMA Foray Wildacres, North Carolina

Sept. 29–Oct. 2

Dr. Orson Miller, Jr., will be Principal Mycologist. Participants at this foray will be limited to 40 persons, double occupancy. There are no private rooms. The cost of the foray is \$175 and covers three nights lodging and eight meals beginning with an evening meal on Thursday Sept. 29 and ending with breakfast on Sunday, Oct. 2. For a registration form see page 16 in this issue of *THE MYCOPHILE*. For additional information contact Allein Stanley at <wildacres@namyco.org>.

3rd International Medicinal Mushroom Conference

Port Townsend, Washington

Oct. 12–17

For details see the May/June '05 issue of *THE MYCOPHILE* or contact Steve at (800) 780-9126, ext. 10, or email at <immc@fungi.com>.

8th International Mycological Congress Cairns, Australia

Aug. 21–26, 2006

It's not too early to start planning—and saving money—for IMC8! Details are forthcoming; in the mean-time, check the Web site for periodic updates: www.sapmea.asn.au/imc8.

"WHY PICKING WILD MUSHROOMS MAY BE BAD BEHAVIOR," screams the title of an essay by Nik Money (author of "Mr. Bloomfield's Orchard" and "Carpet Monsters") in the journal *Mycological Research* (109: 131–35). Well, maybe it didn't scream, but it sure got my attention.

So, fellow mycophages, does collecting wild mushrooms harm the very population of mushrooms that we covet? This is the age-old question. Dr. Money may ruffle a few feathers, but he makes some very interesting points. Consider your feelings on the once widely accepted practice of egg collecting by oologists. Or wild orchid collecting (or any other wildflower collecting, for that matter). Or whaling.

I welcome all your thoughts, but please read Nik's article first, if you can. Now, here's the latest from the printed mycological world.—*Britt*



From a Mycologist Who Breaks the Mold . . .

In a very timely article, the latest issue of *Wisconsin Trails* magazine features a brief article on Tom Volk (this year's host for the NAMA Foray). Tom extols the virtues of a number of fungi and their benefits to mankind. He also gives tips on where to look for morels!

. . . to Ants That Trap with Mold . . .

Here's one you'll find hard to believe. A recent study published in the research journal *Nature* by Allain Dejean and colleagues of the Université de Toulouse in France describes how some tropical arboreal ants are attracted to and take up residence in pouches formed in the stems of leaves of a tree known as *Hirtella physophora*. Furthermore, the tree keeps the ants happy by providing them with nectar snacks that are grown separately from the flowers.

But ants cannot live on sugar alone. They make up for a lack of nitrogen in their diet by acting in groups to capture protein-rich flying and jumping prey—prey that would likely be herbivorous toward the tree.

The ants, *Allomerus decemarticulatus*, seem specifically associated with the Amazonian "ant-plant" *H. physophora*, and take a novel approach to catching prey. Using fibers plucked from the stem of the host plant and bound together by purposely grown fungal mycelia (from a sooty mold), they build a spongy platform for trapping much larger insects, then lie in wait.

The authors note that prey ranges from mosquitoes to grasshoppers. And, yes, they actually placed insects on the platforms to see how the system works. When prey moves onto the platform, the ants spring into action. The ants beneath the platform reach through the holes and immobilize the prey before dividing the spoils among nest-mates. Although it's too bad for the larger prey insect, the ants do quite well. And as the host benefits from the ants' predation (and probably from fecal and carcass waste), it suits the ant-plant just fine. The authors report this to be the first account of a collective creation of a trap as a predatory strategy in ants.

. . . to Very Old Mold

A flurry of articles has been published recently, involving ancient fungi. Nicholas J. Butterfield, of the University of Cambridge, has found fossils of what many believe to be the oldest fossilized fungi ever discovered. He believes that, although not belonging to any living group of fungi, the fossils—1.4 billion years old—are of a very primitive genus called *Tappania*, which was a benthic aquatic group. The jury's still out, but many scientists agree with the findings and think these represent the oldest known group of fungi.

Dr. Butterfield's description of the fossils, which were found on Victoria Island in Canada, is in the latest issue of *Paleobiology* (31[1]: 165–82). There are lots of photos of these bizarre creatures; but they don't look like any modern mushrooms you or I would recognize. *Not even close.*

A large team of scientists led by Magnus C. Lydolph and Jonas Jacobsen describe the diversity of fungi from 300,000 to 400,000 years ago in Siberia. Did they bring some primitive organisms back to life by some new technology? And are dinosaurs next? Nope—they actually isolated DNA locked in ancient permafrost and sequenced the hundreds of samples they found. In addition to a number of plant and invertebrate sequences detected, numerous fungi turned up. Their findings, published in a recent issue of the journal *Applied and Environmental Microbiology* (71[2]: 1012–17), indicate that there was a severe plant shift in plant composition in northeastern Siberia during this time period, judging from the different sorts of tree-associated macrofungi they detected. Other fungi found in their study include a large diversity of cold-adapted yeasts, plant parasites, and lichen symbionts. In other words, the fungal community then looked much as it does today!

In the February 2005 Special Edition issue of *Scientific American* (15:1) is an article entitled "The Iceman Reconsidered." You may recall that in 1991 the body of a 5,000-plus-year-old Neolithic man was discovered in a melting glacier. In the decade since his discovery a great deal has been determined about how Ötzi (named for the Ötztal Alps where he was found) lived and died.

Naturally, I wouldn't be mentioning him in these pages if fungi weren't involved! A number of fungi

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Fungi in the News, continued from page 5

were found on *and inside* the body of this primitive fellow. Of course, some were most likely molds acting to decay the corpse. I seem to recall Meredith Blackwell's lab at LSU determining (using DNA sequencing) that much of this was *Botrytis cinerea*, a common mold found in many of our refrigerators. Most noteworthy, though, were pieces of bracket fungi: the tinder fungus, *Fomes fomentarius* (also known by other names), no doubt carried to light fires; and *Piptoporus betulinus*, a species long used as a styptic and as an antimicrobial to help heal wounds. It has been noted that this mushroom was also used as a vermifuge; and Ötzi did, indeed, have a bad case of whipworms, as determined during the autopsy. For some terrific photos, I'd recommend going to the library and pulling out the February 2003 issue of the *Smithsonian*.

Shrinking *Coprinus*?

Walter Gams reports on page 18 of the latest issue of *Inoculum* (56[3]) that the genus *Coprinus* is being reduced by numerous species. This is based on a number of studies that have been published over the past few years. Numerous species were found to be polyphyletic and several belonged to two different families. A summary of this nomenclatural shift is forthcoming in the May issue of the journal *Taxon*.

Proposal for a Single Scientific Name for All Species of Fungi

Also in the latest *Inoculum* (56[3]: 3–6), Amy Rossman and Gary Samuels propose that a single species name be used for all fungi. This is a vexing issue to neophytes and mycology students alike: the practice of naming fungi based on sexual characters—and what to do about those fungi for which no sexual state is known. I'm talking about the teleomorph and anamorph states, respectively. Those fungi (and there are lots of them) that have no

known sexual state have historically been placed in their own group: Fungi Imperfecti or Deuteromycetes. Most confusing of all is when you come to the realization that an "imperfect" fungus with one name is synonymous with another, previously named, teleomorphic species. Of course, the system of naming asexual fungi has always been necessary. However, nowadays there really is little need to keep anamorph-specific names, as the teleomorphic species (or genus, anyway) can be determined through DNA sequence analysis.

Scientists Confirm Gut Feeling about Yeasts

Yeasts are some of the best-known and most ubiquitous fungi. About 1,000 species are known. Resulting from a study by Sung-Oui Suh and Meredith Blackwell of LSU, that number has just gone up by 200. The researchers are interested in the fungal flora of the guts of insects and other arthropods, and how these fungi benefit their host organisms. It seems that cellulose-fermenting yeasts may play a crucial role in the insects (including beetles) that consume plant material. The discovery of so many new species came while surveying a number of beetles from the southeastern US and Panama. It was published in the journal *Mycological Research* (109: 261–65).

The authors are confident of finding hundreds more new species. In fact, the currently known species of yeasts may end up being only about 1% of all the species out there! Incidentally, the "beetle belly" yeasts (I'm not making this up, that's what Dr. Blackwell calls them!) comprise species from genera familiar to many of us, including the ascomycete *Candida* spp., but also include some basidiomycete representatives, as well, including *Trichosporon* spp.

For more on insect yeasts and other insect-fungus interactions, see the Book Reviews on page 18.

The Wrap-up from Across the Pond . . .

Pleurotus eryngii is a choice edible mushroom that is gaining in popularity as a commercially produced species. This "species" actually exists in nature as a species-complex, defined by different hosts and environmental factors (e.g. altitude). In a recent issue of the British journal *Mycological Research* (109: 71–80) De Gioia *et al.* set out to explore the genetics of this species to locate varieties with better commercial traits, including yield. Along the way they found a mushroom species with a high degree of genetic diversity, and in the article they discuss possible reasons.

You probably knew that *Cordyceps* species are parasites of insects and other arthropods. But did you know that some species parasitize other species of fungi? You also may not have known that the taxonomy of the genus is a mess. Stensrud *et al.* (*Mycol. Res.* 109: 41–56) are aiming to change that with their study.

Another article (this one is a review article) from the same issue of *Mycological Research* that may be of interest to you is titled, "Basidiomycete mycelia in forest soils: dimensions, dynamics and roles in nutrient distribution" (109: 7–20) by John W. G. Cairney of Australia.

A team of researchers, including NAMA's own Jim Trappe, have named two new genera of desert truffle from Africa (Ferdman *et al.* *Mycol. Res.* 109: 237–45).

Volume 19, Part 1 of *Mycologist* has an interesting discussion of the use of host specific "mycoherbicides" (presumably, concoctions of the spores of fungal plant pathogens) to eradicate source plants for illicit drugs, including opium poppy and coca.

From the Pages of *Fungal Genetics and Biology* . . .

To better understand the genetic mechanisms underpinning the process of mushroom development, a team of researchers at Tsukuba Science City in Japan, led by

Yasumasa Miyazaki, developed a technique to isolate developmental regulation genes in the Shiitake mushroom, or *Lentinula edodes*. In their paper (42[6]: 493–505), the researchers describe how they isolated more than 100 genes from two stages of the fungus, the “vegetatively growing” hyphae and the developing fruitbodies. By comparing the sequences of those genes to sequences previously found in two other basidiomycete fungi (*Phanerochaete* sp. and *Coprinopsis* sp.), they were able to locate a number of genes unique to Shiitake, and of those they selected the ones only functioning during mushroom formation. Of course it doesn’t mean that any of these genes are responsible for mushroom development, but at the very least these scientists are on the right track!

Many of us are familiar with the human pathogenic yeast fungus *Candida albicans*. This fungus is a ubiquitous member of the human flora; it’s thought that we all have this species, plus hundreds of bacterial species, living in relative harmony on and in our bodies. Many species of microbes are known to suppress the growth of others, thus preventing disease. But if something upsets that balance (including high doses of antibiotics which can kill off much of our beneficial bacterial flora), this fungus can cause a severe invasive disease known as candidiasis, or a “yeast infection.” Well, it seems that humanity has suffered with this pathogen for a long time. *A very long time*. Timothy Lott and colleagues (42[5]: 444–51) have determined that, based on DNA sequence information, this species has been around for somewhere between three and 16 million years. This suggests that this organism has been around since the beginnings of early hominid evolution.

Of course there are fungal pathogens of animals that have been around even longer than *Candida albicans*. The dinosaurs no doubt were afflicted with fungal diseases. But could pathogenic fungi have had

a role in the extinction of poikilothermic (“cold-blooded”) dinosaurs and led to the flourishing of endotherms (“warm-blooded”), such as birds and mammals? That is the question posed by Arturo Casadevall of the Albert Einstein College of Medicine in New York (42[2]: 98–106). Dr. Casadevall notes that evidence of deforestation and a proliferation of fungal spores can be found in the cretaceous-tertiary boundary soil layers (the same layers where the dinosaur fossils stop) and that this suggests a link. Of terrestrial animals, the birds and mammals (all endotherms) have few fungal pathogens, while ectotherms like insects are plagued by numerous species of lethal fungi (for example, *Cordyceps* sp. and *Entomophthora* sp.).

“Why did the Fleming strain fail in penicillin industry?” is the title of a paper (42[5]: 464–70) by Marta Rodríguez-Sáiz and others at Antibióticos, a pharmaceutical company in León, Spain. Penicillin, discovered 77 years ago by Alexander Fleming, is a naturally produced compound excreted by the mold *Penicillium notatum*. While Fleming eventually shared a Nobel prize for his discovery, the above fungus proved to be of little use in making this miracle antibiotic. It was the scientists Chain and Florey who later found in 1943 that another species, *P. chrysogenum*, makes the same compound—and 1,000 times the amount of the original species. Turns out that a single genetic mutation is responsible for the superlative production. Penicillin production begins with the production of a precursor acid that can be converted to either penicillin or another compound, 2-hydroxy-PA. The researchers found that the latter species has a gene defect that prevents it from producing much of the 2-hydroxy-PA. The result is that it gets stuck in its penicillin-making mode. Lucky for Fleming—and all of humanity—as the number of deaths and suffering this drug has staved off is nearly enumerable.

Speaking of Mushroom Drugs, What’s New with Psilocybin, Dude?

Back in the early sixties Harvard psychologist Timothy Leary snuck lysergic acid diethylamide (LSD) (out of campus laboratories and into the mainstream. Soon, tie-dyed hell broke loose in popular culture, and psychedelic drugs were quickly banned. By the decade’s end, they had all but vanished from the psychological research scene.

A report in the journal *Psychology Today* [March/April 2005] states that now, for the first time in some 30 years, human studies of such contraband substances are on the upswing. Many researchers say it should have happened sooner. “The banning of psychedelics has been an absolute disaster for consciousness and medical research,” says Rick Doblin, head of the Multidisciplinary Association for Psychedelic Studies, a nonprofit pharmaceutical company funding much of this new work.

Many researchers say hallucinogens were kept out of research labs because of fear generated by drugs like methamphetamines and heroin and the “war on drugs.” In fact, there’s little evidence that psychedelics are either addictive or more dangerous than, say, alcohol or marijuana, researchers report. Doblin argues that in the intervening decades, advances in everything from disease treatment to consciousness studies to basic psychological research have suffered. “These new studies are just the first steps on a long road to recovery,” he says.

The turnaround started in the early 1990s, when the Food and Drug Administration ran out of reasons, political and otherwise, to quash contraband drug research, Doblin says. Scientists hope hallucinogens can make inroads with tough-to-treat conditions, says Charles Grob, chief of adolescent and teen psychiatry at the University of California at Los Angeles. Grob is picking up where another researcher, Eric Kast, left off in the 1960s. Kast had promising results using LSD to relieve anxiety in

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Fungi in the News, continued from page 7

terminally ill cancer patients. Of course, LSD, or similar naturally occurring chemicals are derived from the Ascomycete fungus *Claviceps purpurea* which is also known as "ergot." To follow up on those results, Grob is currently investigating psilocybin—the magic in "magic mushrooms"—as a treatment for anxiety in late-stage cancer patients.

Researchers hope this is only the beginning of a hallucinogenic data mine. Grob also points out, "People forget, but psychedelics were the cutting edge of science in this country for 50 years." In fact, in the 1940s and '50s, so much money flowed in this direction that quite a few top researchers got their start in this field. Many feel modern psychiatry owes its origins to the study of hallucinogens. After all, it was the discovery of the neurotransmitter serotonin—thanks to LSD—that jump-started the brain chemistry revolution.

Flashback in the lab: Six psychedelic drug studies are underway, all aimed at some of medicine's more intractable problems. The Medical University of South Carolina has a study, directed by Michael Mithoefer, on "DMA (ecstasy) in conjunction with cognitive behavior therapy for the treatment of post-traumatic stress disorder triggered by sexual abuse." A University of Arizona study, under the head of Francisco Moreno, is looking into "Obsessive-compulsive disorder treatment with psilocybin." As mentioned above, a study at UCLA, led by Charles Grob, is examining "Late-stage cancer-related anxiety treated with psilocybin and therapy." Harvard University, the research home of Timothy Leary, has two ongoing studies. The first, led by John Halpern, is looking into "Late-stage cancer-related anxiety treated with MDMA and therapy." A second study, directed by Andrew Sewell, is examining "Treatment of cluster headaches with LSD and psilocybin."

Black Mold . . . or Black Gold? . . . or Much Ado about Nothing?

What ever happened to the fungus *Stachybotrys chartarum*? You may recall seeing this fungal name in the news frequently over the past several years. It seems that wherever people looked around their homes, they were finding this black mold growing just about anywhere that was damp and dark. Back in the mid 1990s in Cleveland, Ohio, this fungus was believed linked to nine infants' deaths from mysterious brain hemorrhages. The infants became sick not long after their homes were damaged by flooding. In all cases, a black mold identified as *S. chartarum* was found.

So begins the infamous history of this otherwise unremarkable mold. Since that time, numerous disorders have been blamed on this mold. It almost has become common knowledge that this fungus (or some sort of fungal compound, such as a mycotoxin) can cause health problems including cancers, respiratory problems, immune system disorders, and memory loss. Or can it?

Well, it is certainly well established that mycotoxins can cause all sorts of ill effects, including cancer and death. But *Stachybotrys*? A number of researchers are beginning to stand up and say firmly, "No." Two California doctors, Mohan Nair and Ashok Jain, wrote an article in the journal *New Scientist* (185[2490]: 17–21) entitled, "Worst effects of toxic mould 'are all in the mind.'" The gist of the article is that these doctors (one, a psychiatrist, and the other, a toxicologist) have found that the majority of people report ailments that are impossible to confirm, and that between 70 and 80 percent of lawsuits involving indoor molds have no medical basis. And lately there has been a great deal of mounting evidence casting doubt on *S. chartarum* as a cause of any health effects.

But that doesn't seem to bother a number of scientists who are making their careers pay in a big way by serving as "expert witnesses" in lawsuits involving indoor molds.

In the May 11, 2005, issue of *Forbes* magazine Daniel Fisher wrote an article titled "Dr. Mold" that describes how a number of scientists have played significant roles in some major insurance claims cases; three billion dollars in insurance claims were paid out in 2002 alone. The author exposes the credentials of many of these characters as exaggerated, at best, and outright fraudulent at worst. And just how rich are these "experts" getting? One former physician charges \$9,800 up front, plus \$975 per hour.

As stated above, it's well known that fungi can cause health problems, including allergies and asthma. There's no question that ingested mycotoxins (typically in contaminated foods) can have devastating effects on humans, livestock, and pets. But what about inhaled mycotoxins? This has been one of the claims some have made regarding the *S. chartarum* story. This seems pretty unlikely as well, according to a feature review article published recently by Bruce J. Kelman and colleagues in the *International Journal of Toxicology* (23:3–10). In an extensive study the authors calculated the maximum possible dose of mycotoxins coming from inhaled spores from a number of mycotoxigenic fungi including *S. chartarum*, *Aspergillus flavus* (the source of aflatoxin), and *Aspergillus fumigatus*. They concluded that the maximum possible dose an individual could inhale in a 24-hour period would be nowhere near great enough to pose any sort of a health risk. Additionally, the authors review a number of other recent studies showing no link between indoor molds and nonallergic health effects.

For more information on problems with indoor molds, I recommend "Black Mold: Your Health and Your Home" by Richard F. Progovitz. This book, published in 2003 (ISBN 0-974394-39-4), is small and concise, and written in easy-to-read English. There are good descriptions of

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Are You a Mycophobic? Take This Test to Find Out

Most of our members are "social shroomers." They come to several forays each year to pick edibles and increase their knowledge, but mainly just to get out into the woods on summer and fall days and socialize.

But there are some among us to whom mushrooms are no longer just a casual interest or an enjoyable warm-weather hobby, but rather a compulsion, an obsession. Such people will be out picking on sweltering August days and in freezing December weather. During peak season, they will be shrooming not just on scheduled forays, but two, three, or more times a week. These people are mycopholics!

Mycophobia is a serious problem that is spreading its mycelia throughout our society. It isn't a problem confined to the poor and underprivileged or to recent immigrants from Eastern Europe. Mycophobics come from all walks of life: lawyers, production managers, doctors, antique dealers, garden-clubbers, physiologists, chemists, students, farmers, housewives—anyone can become a mycophobic.

There are a few clues that differentiate a mycophobic from a casual collector. For example, in their cars they have a six-month supply of waxed paper bags in the back seat and dried up *Tricholomas* in the ash tray. They wear little or no jewelry except a hand lens around the neck. While these traits do not automatically condemn someone as a mycophobic, they are among the warning signs to watch for.

Are you a mycophobic? Not sure? Then you'd better review some of the following warning signs. (Score 1 point for each "yes" answer.)

Fungi in the News, continued from page 8

symptoms attributed to *Stachybotrys* along with other mycotoxigenic fungi. There are even tales of famous people afflicted with moldy homes, including Ed McMahon, of "Late Night" fame, and Erin Brockovitch, environmental activist turned mold activist. It seems that the million dollars she won from Pacific Gas & Electric for groundwater contamination was spent on a mansion—which turned out to be moldy. She spent the rest of her fortune and more on remediation!

Update on the "almond mushroom," *Agaricus blazei*

You may recall the "new" cultivated mushroom that burst onto the scene a few years ago. Known as the "almond mushroom," "almond scented mushroom," and "almond *Agaricus*," this mushroom has been heavily touted by Paul Stamets (among others) as the replacement for most varieties of commercial mushrooms. Besides its reported delectability (with a scent of almonds), this mushroom has generated a great deal of interest in its purported medicinal properties. Recently

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- Do you pray for rain?
- Does your heart beat faster when you see a stump?
- Do you salivate upon hearing "morel"?
- Do you abandon guests, family, or business, just to go on a foray?
- Do you get evasive and try to change the subject when someone mentions your favorite spot for *Boletus edulis* or *Morchella esculenta*?
- Is your temporal framework modified?
- Do you no longer think of the seasons as spring and fall but as "morel" and "honey"?
- Do you find yourself used to eating or even expecting to eat such items as dirt, non-amyloid spores, and dipteran larvae?
- Do you get irritated at little things that keep you from foraging? Things like work, home life, police speed traps, and No Trespassing signs?
- When you see a beginner with a choice edible, do you say, "Gee, that's an interesting one. Do you mind if I take it home to study?"
- Is your idea of eroticism a *Phallus ravenelii* (Stinkhorn)?

Here's an interpretation of your scores:

0-4 You may be normal. Pray!

5-8 You may be a mycophobic but you need to have a spore print taken to be sure.

9-14 You are a confirmed mycophobic. Seek help.

15+ You are probably beyond help.

Just what are the dangers of mycophobia? Besides the obvious deleterious effects on the social, home and business life, this disease has very real consequences as well. Mycologists, in addition to their tendency to have a sore head from walking into things because they always look down instead of head-up, frequently suffer from a number of physical infirmities that are a direct result of their habit of stooping, bending, kneeling, tugging, lugging, and picking. These include Entoloma elbow, Dentinum disk, Naematoloma neck, Trich knee, and with some a *Gymnopilus glaze* in the eyes.

There are some mycophobics whose all-too-frequent *Bolete* binges have reduced them to physical wrecks. These people keep coming to forays, often dragging pillows on which they can ease their aching frames after a frantic fungal frolic.

So, what can be done for a mycophobic? For a start, you should rid your home of all fungi and mycological paraphernalia. Begin by sending all your dried morels and *Boletes* to me. After that, you're on your own.

—Scott Stoleson

Reprinted with permission from *The Kansas Mycologist*



Ustilago cynodontis on *Bermuda grass* (*Cynodon dactylon*)

Smut! Continued from page 1

and *Ustilago maydis* in Latin—different names for the same thing, a fungus that grows on corn. Infected corn ears develop huge galls, part fungus, part plant, that eventually burst open and release the dark dusty spores. Less conspicuous is the presence of fungus on other parts of the plant, but it certainly is not restricted to the cobs.

Corn is not the only smut-infested plant valued by gourmets; tender, young shoots of wild rice with the smut *Yenia* (*Ustilago*) *esculenta* are a much prized delicacy



in China. However, there is little good (from a human perspective) about most of the 1,450-some species of smut that parasitize around 4,100 species of plants. Only a few tree and shrub species are

prone to smut infections, and the same is true for ferns. Furthermore, the huge family of orchids is completely free of smut. However, where smut is at home is among sedges and grasses (corn, barley, wheat, and a whole array of non-cereals). We see it next to sidewalks in Berkeley, California, looking like dark powdery flower stalks in the Bermuda grass (see the photo on the left).

There is the usual variation in host specificity: the corn smut occurs only on corn (*Zea mays*), while others can be found on a wide array of plants. *Ustilago*



hordei, for instance, infects not only barley as the name indicates, but a slew of other grasses. Water plants, like arrowleaf and water lily, have their own special fungal communities. Here it is the environment that shapes the species composition, rather than the identity of the host plants. There is even one species of smut or smut-like thing, *Malassezia furfur*, that is a human pathogen, causing a skin rash.

Smutts can cause havoc in agricultural crops, especially on cereals like wheat, with losses in yield and in money. Karnal bunt is an example: in 2002, when this Asian disease turned up in some



counties in Texas, within a day over 25 countries had banned the import of grains from the infected areas, with an estimated loss of \$27 million. This disease has such potential to cause economic damage that it is mentioned as a possible bioterror agent.

But what exactly is a smut; how does it grow; what are its closest relatives? Let us zoom in on the corn smut and see how it lives.

We'll start with the spores that are formed in the gall. These are called teliospores, and their appearance in huge amounts on the plant is in many cases the first and only



signal that the plant is diseased. The dark, thick spore wall indicates that these spores, which are carried by the wind, are adapted for dispersal and survival under adverse circum-

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Painted Mushrooms, continued from page 1

I knew something about the mushroom wasn't quite right, but I couldn't put my finger on it. I think the painted mushrooms are so interesting because they look quite real; after seeing so many stylized pictures of mushrooms, I think my mind's eye sometimes *expects* them to have fluorescent colors.

Before I get a ton of letters in protest over the artist's use of potentially harmful pigments and dyes in nature, I must point out that Nancy is ecologically very reverential. She told me that, immediately after painting and photographing her subjects, she wipes them clean, leaving no trace. (That's fortunate; with their

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Illinois Three



Canada Three



Wisconsin Four



Canada One

Mushroom

The Journal of Wild Mushrooming

Other magazines urge you to subscribe, but we invite you to join friends on what we call "printed forays"!

For 20 years, *Mushroom the Journal* has provided information of value to those who like to hunt, name, cook, study and photograph wild mushrooms. We've answered —

- How do professionals find "pillowcasefuls" of morels?
- In the future, will you have to pay to pick on public land and still have to contend with bag limits?
- If you discover a new species, can you name it anything you want?
- Should you worry about violence from commercial pickers?
- Can you do more with choice edibles than toss them in a sauté pan with butter?
- Can you grow your own truffles? Train your own truffle hound?
- Can you subscribe to the *world's best mushroom magazine* and have your satisfaction guaranteed? (You certainly can guess that answer—and yes, you can also train the dog.)

We're proud of the job we do of reviewing books of interest to the amateur mycologist. Before you buy, you'll know whether you should. Think we're kidding about "joining" rather than "subscribing"? Our Letters column lets you speak out, or contact others to seek that special book or sell that historic mushroom basket.

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Two Bolete limericks by Charmoon Richardson

I once heard that boletes can giggle
If given just the right jiggle
It's a tickle that comes when
All the maggots in the stem
Cause the whole thing to wiggle

I once met a bolete that talked
It had a mouth at the top of the stalk
The funny thing was
It couldn't say much because
The whole thing was starting to rot

Limericks reprinted with permission from SOMA News (Sonoma County Mycological Association) and the author. For more mushroomy limericks and other fun things, write to Charmoon Richardson, The Wild about Mushrooms Co., P.O. Box # 1088, Forestville, CA 95436, or check out his Web site at www.wildaboutmushrooms.net.

Fungi in the News, continued from page 9

"discovered" and named *Agaricus blazei* (as well as *A. brasiliensis*), this edible species was found in the deep dark recesses of the Brazilian rainforest. Or was it?

According to Dr. Richard Kerrigan of Sylvan Research (the world's largest commercial producer of *Agaricus* spawn; spawn is the "seed" mushroom growers use to inoculate compost for a mushroom crop), it ain't so. In a paper published in the latest issue of the journal *Mycologia* (97: 12-24) *A. blazei* is shown to be nothing more than *A. subrufescens*, a commercially important species from days gone by.

Agaricus subrufescens was first described in 1893 by C. H. Peck. The species was widely cultivated and eaten in the Atlantic states from the late 1800s until the early 1900s. It was then replaced by the "button mushroom," *A. bisporus*, which became the commercially preferred member of the genus until today. According to Dr. Kerrigan, *Agaricus subrufescens* still can be found growing in the wilds of northeastern North America, as well as in the West.

Dr. Kerrigan, a world authority on the genus *Agaricus*, previously has raised doubts over the identity of *A. blazei* / *A. brasiliensis*. In this latest paper, he relied on DNA sequence analysis, along with conventional morphological features, to state with absolute certainty the true identity of the almond mushroom.

Also from the pages of *Mycologia*—

Stephen Rehner and Ellen Buckley of the USDA have made efforts (97: 84-98) to resolve the taxonomy of the entomopathogenic (a big word that means "a pathogen of insects") fungus *Beauveria*. It seems that this group is most closely related to the highly prized (for its medicinal properties) genus *Cordyceps*. In fact,

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The North American Mycological Association
NAMA '05
University of Wisconsin at La Crosse
Thursday, July 21st, through Sunday, July 24th, 2005

Ann Bornstein, Registration
 336 Lenox Ave., Oakland, CA 94610-4675
 <gramma.ann@att.net> • Tel. (510) 839-2487

Complete both sides of this form and send to Ann Bornstein with your check, payable to **NAMA '05**.

Name(s): _____

Address: _____

City, State, Zip: _____

Phone: _____ Email: _____

Names and club affiliation for name tags: _____

Assign roommate: Male Female I want to share a room with: _____

REGISTRATION

Complete package (Floors 1 and 2) # _____ @ \$275.00 ea \$ _____

Complete package (Floors 3 and 4) # _____ @ \$250.00 ea \$ _____

Single supplement @ \$ 25.00 \$ _____

(includes 3 nights, 9 meals and all programs)

Commuters (off-campus) # _____ @ \$180.00 ea \$ _____

(includes programs, 6 meals, no breakfasts)

NAMA Trustees meeting Wed. July 14th # _____ @ \$ 80.00 \$ _____

Single supplement @ \$ 25.00 \$ _____

(includes 2 nights, 6 meals)

NAMA membership (required if not current) # _____ @ \$ 35.00 \$ _____

Late fee (after June 20) @ \$ 25.00 \$ _____

Mycology student discount: subtract -\$100.00 \$ _____

Total \$ _____

Do you require vegetarian meals or have other special concerns? _____

Are you a vendor? Items for sale _____ Amt. of space desired _____

*Be sure to sign the Liability Release on the other side of this page. **We must have a signed release for all adults attending the foray.** Also, please note any areas in which you would like to volunteer.*

LIABILITY RELEASE AND PROMISE NOT TO SUE

I understand that there is some risk in participating in a mushroom foray and conference: all those risks one assumes by being away from home, risks associated with moving about in fields and woods, risks involved in eating wild mushrooms, risks of losing personal property by theft or misplacement, and all other expected and unexpected risks.

In registering for or attending this foray, I agree to assume total responsibility during this event for my own safety and well-being, and that of any minor children under my care, and for the protection of my and their personal property. I release the North American Mycological Association (NAMA), its trustees, officers, employees, contractors, and all other persons assisting in the planning and presentation of this event from liability for any sickness, injury, or loss I or any minor children under my care may suffer during this event or as a result of attending and participating. I further promise not to file a lawsuit or make a claim against any of the persons listed above, even if they negligently cause me or my minor children injury or loss. Finally, I agree to hold NAMA harmless from any liability it may incur as a result of any damages to UW-LaCrosse property that I may cause.

This release and promise are part of the consideration I give in order to attend this event. I understand that it affects my legal rights. I intend it to apply not only to me but to anyone who may have the right to make a claim on my behalf.

Signature 1: _____ Date: _____

Print Name 1: _____

Signature 2: _____ Date: _____

Print Name 2: _____

VOLUNTEER OPTIONS

If you can help in any way, please let us know. The volunteer time of our members is what continues to make NAMA forays such a success and great time for everyone. The coordinator will contact you with details prior to the foray.

Registration

Assemble information packets

Registration desk:

Thurs. 10 a.m.–1 p.m. 1 p.m.–4 p.m. 4 p.m.–6 p.m.

Display & identification area

Set up Assist identifiers Clean up

Mycophagy

Set up Preparation (Sat.) Clean up

Raffle

Solicit prizes prior to foray Assist at foray

Other:

Smut! Continued from page 10

stances. There are other smuts, the anther smuts, in which the spores are transported from plant to plant by flower-visiting insects, but corn smut spores overwinter in the soil. When the teliospore starts to germinate, it acts like a basidium, the structure in which nuclei (the cell regulators) fuse. In this case, the binucleate teliospores produce basidiospores with a single nucleus. Mushrooms, from boletes to chanterelles, from conks to crusts, need special fruiting structures to produce spores. Smuts do it with a single cell. These basidiospores have a saprotrophic lifestyle and can grow outside the plants; they are single cells which bud and behave like yeasts. This phase has been studied extensively in the lab, as you can grow these cells on agar plates.

The spores are also the primary infection agents. When two basidiospores mate, they fuse to form a new mycelium, and the smut embarks on its parasitic phase. Infection takes place in different parts of the plant. It can happen via the silk of the cob, interfering with pollination, which sets off a race between pollen grain and smut spore. As the mycelium grows within and between the plant cells, it causes these cells to divide like crazy and at the same time grow bigger: a gall is born. The teliospores are then formed as modified parts of hyphae. The plant epidermis breaks open, the spores appear, and the circle is complete.

Of course, other smuts do parts of this cycle in different ways; but for most species, the life cycle is not known in such detail as it is for the economically important corn smut. Some species infect seeds, some grow throughout the plant and persist in it for the whole lifetime of the plant. As one example, take *Microbotryum violaceum*, which is a very interesting anther smut, specializing on carnation-like plants in the family Caryophyllaceae. Species in this family are often dioecious, which means that there

are plants with exclusively female flowers and plants with male flowers. The anther smut occurs only on the male flowers and subverts the flowers to produce dark purple spores instead of pollen. This strategy should mean only a 50% infection rate (only half of the plants are male), but the smut has found a way to do better. It attacks plants with female flowers by first performing a sex-change operation!

It took mankind quite a while to understand the real nature of the smuts. The classical Greek Theophrastus wrote, "Bunt or stinking smut of wheat is caused by the action of the burning rays of the sun falling on the heads that had been penetrated by abundant rain." It was only in the mid 1700s that this theory was proven wrong by a Frenchman, Matthieu Tillet, who did a bunch of nice experiments. First, he planted a wheat plant in a pot which he kept really wet. The plant stayed infection free, contrary to the prevailing opinion that abundant rain caused the infection. Second, he planted grains with smut spores in some plots and non-infected seeds in others and recorded carefully the number of diseased plants in each plot. The infected seeds produced infected plants, and most plants of the blanks stayed disease-free. This method did not work for corn smut, as the infection does not happen via the seeds, so there he concluded that it was a characteristic of the plant and the circumstances under which it was grown. Even when it was known that the smuts were not part of the plants, it still took considerable time to realize that they were fungi. Researchers did not see any hyphae among the spore masses. And as recently as 1967, new *Silene* species were described based on the dark colour of the "pollen grains." We know now that this was merely due to an anther smut.

Fungi with so few apparent characters, mainly spores and hidden hyphae, are difficult to classify. The big breakthrough came with electron microscopy and with

the use of molecular characters for identifying major groups. It then was realized that anther smuts are more closely related to rusts, another big group of basidiomycete plant pathogens, and that other groups of plant infesting fungi are nested within the "proper" smuts: *Exobasidiiums*, for instance, the fungi which cause galls and misshapen leaves in *Rhododendrons*, *Vacciniums* and *Manzanitas*. In other words, different groups of fungi have come up with the same idea of forming powdery spores in great masses on plants. When we look at family relationships with molecular techniques, we find that rusts and some smuts haven't changed much since the common ancestor of all fungi with basidia. The other smuts had a somewhat more recent ancestor but also haven't changed much. The branch that underwent extensive evolutionary change is the one that led to the familiar gilled mushrooms and boletes.

The question "what exactly is a smut?" is harder than ever to answer. Right now, the best definition is "basidiomycete plant parasites which produce teliospores." Not a very satisfactory definition, but one that works!

Dr. Vellinga works on the systematics and phylogenetics of Lepiota species in Tom Bruns's Lab in the Plant and Microbial Biology Department of the University of California at Berkeley. Except where indicated, all photos in this article are by Gerald Pataky of the University of Illinois, Champaign.

Fungi in the News, continued from page 12

the two groups are pretty much synonymous, with *Cordyceps* producing some anamorphic *Beauveria* isolates. That is, cultures can be made in the lab from wild *Cordyceps* tissues, and these can produce asexual mycelium of *Beauveria*.

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NAMA WILDACRES REGIONAL FORAY
September 29–Oct. 2, 2005
Wildacres , North Carolina

To register, complete this form and mail with a check for \$175, payable to NAMA, to Allein Stanley, 136 Homeplace Drive, Mount Holly NC. For additional information call (704) 827-1939 or email <wildacres@namyco.org>. Persons sharing a room may use the same form.

1. Name _____

1. Male Female

1. Address _____

1. Phone _____

2. Email _____

3. I wish to room with _____

4. Dietary requests _____

5. Bedding preference: Double Single

1. Name _____

1. Male Female

1. Address _____

1. Phone _____

2. Email _____

3. I wish to room with _____

4. Dietary requests _____

Bedding preference: Double Single

Participants at this foray will be limited to 40 persons, double occupancy. There are no private rooms. The cost of the foray covers 3 nights lodging and 8 meals beginning with an evening meal on Thursday, Sept. 3, and ending with breakfast on Sunday, October 3.

Liability waiver: By signing below, I release the North American Mycological Association, its officers and members from any and all liability and loss arising from any accident, injury or illness which may result from activities of the NAMA regional foray at Wildacres.

Signature #1 _____

Signature #2 _____

Date _____

Date _____

Fungi in the News, continued from page 15

Is *Beauveria* the "cure" for malaria?

And speaking of *Beauveria*, two research papers in the latest issue of the journal *Science* (308[5728]: 1638–41; and 308[5728]: 1641–42) lend hope that the spread of malaria can be contained in the future—using fungi!

It seems that two entomopathogenic fungi, *Beauveria bassiana* and *Metarhizium anisopliae*, were found to be highly successful in killing mosquitoes (the insect vector of the disease malaria), and harmless to humans and other mammals. These two fungal groups are well known the world over as bug killers. In fact, probably every group of insects has a corresponding strain of pathogen from one or both genera.

Although many researchers are playing down the discovery, saying that commercialization of the two

fungi is a long shot, at best, the findings made a big splash in the news, with *The New York Times* (among other newspapers) and the British journal *Nature* reporting it.

Speaking of Books . . .

You may recall that in the March/April 2005 issue of *THE MYCOPHILE* I suggested five books, all fiction, and all with stories centered around mushrooms (or fungi, at any rate). There aren't too many such works of fiction (that I can think of, anyway); so how ironic it was when, just as that issue was going to press, another such work fell right in my lap. Published in

Continued on page 17

Mushrooming Anxiety

Restaurateurs, foragers worry about more regulation; one East Village chef innocently picks wild toxic “destroying angel.”

by Kate Pickert

Wild-mushroom fans are in an excitable frame of mind: morel season—the most bountiful time of the year—has just started. But there’s also a dark cloud hanging over New York’s fungi community, ever since California health officials shut down several mushroom vendors at farmers’ markets this year, pledging to regulate what has long been a self-policed industry of foragers, restaurateurs, and gourmards. The officials’ fear? That lack of oversight is paving the way for poisonings.

At least fifteen North American mushrooms are toxic enough to kill. New York has about 60 poisonings a year, according to the Health Department (the majority are small children “grazing” and people trying to get high).

At the moment, New York State agriculture laws say mushrooms picked in the wild can be sold if they’re inspected by “an approved mushroom identification expert” but don’t specify what constitutes expertise.

It isn’t always easy to tell if mushrooms are safe, even if you’re ‘shroom-savvy. Colin Alevras, chef at the Tasting Room in the East Village, picked a bagful last year that he found in the yard of his father’s house upstate. He took it to Michael Hoffmann, a wild-mushroom vendor at the Union Square farmers’ market. “Michael took one look and said, ‘Throw the whole bag out and wash your hands. Keep them away from my mushrooms.’ I had picked a destroying angel,” says Alevras, referring to one of the most beautiful but toxic local varieties. “It made me really nervous.”

City health codes ban chefs from serving mushrooms picked in the wild. Most “wild mushrooms” on menus are in fact cultivated specialty varieties like shiitakes. As Laura Phelps, president of the American Mushroom Institute, notes, “Any dish under \$20 is not going to have wild mushrooms.”

Some chefs use the real thing, though, and predict increased regulation is just a matter of time. Blue Hill chef Dan Barber says, “I would hope this stays on the back burner.” “I fear they’re going to regulate everything,” adds Alevras. “It would be a drag and push people out of the business. We’d have to have secret underground mushroom clubs.”

[Originally published in New York Magazine May 9, 2005; Vol. 38[16]: 16–17. Reprinted with permission. By the way, you may remember Ike mentioning the perceived need for “approved mushroom identification experts” in the last issue of THE MYCOPHILE. —Britt]

Painted Mushrooms, continued from page 11

new hues, I’m sure I would be duped into believing I’d just stumbled upon a new species!) Nancy says she tried a number of different kinds of paints over the years before she hit upon a pearlescent (and environmentally benign) liquid acrylic paint that shows up well on the often dimly lit forest floor—and in the digital prints.

The artist certainly has a passion for mushrooms. She is a member of NAMA and the Wisconsin Mycological Society. Besides studying and painting mushrooms, she is an avid collector of things with mushroom motifs. She showed me the mushroom handkerchiefs that she’s started collecting. We talked at length about her extensive collection of mushroom salt and pepper shakers, which has been on display at the Wendy Cooper Gallery in Madison. Nancy says the Internet makes finding and purchasing such items very easy. A little too easy, she adds: one’s hobbies can very quickly impinge upon another’s space around the home (she is married to another faculty member of UW–Madison, and has two cats).

Besides painting mushrooms (and mastering the art of making digital images of her work), Mladenoff also combines brightly colored sculpting clay and mushrooms (and plants) found in nature. She also manages to find time to tend to her students; she teaches painting to both undergraduate and graduate students and serves as advisor to 10 graduate students in the Art Department.

Not long ago she had an exhibit at the Wendy Cooper Gallery that was titled “Hush, you mushrooms.” In addition to recent shows in the Chicago and Madison areas, Mladenoff has shown extensively all over the U.S., as well as London and Germany. She is looking forward to a sabbatical in Norway in the near future, where she’ll no doubt find plenty of subject material. Following her stay in Norway, she has another sabbatical and show scheduled in Tabor, in the Czech Republic.

Fungi in the News, continued from page 16

2004, *Jack in the Pulpit*, by Cynthia Riggs, is the fourth in a series of mysteries featuring the character Victoria Trumbull, a wise and sprightly nonagenarian. The story is set in a peaceful nook of Martha’s Vineyard where the sudden death of four people in one month, all parishioners at the same church, has upset the island’s tranquility. I don’t want to spoil the story for you, but mushrooms are definitely involved. Although a little predictable at the end, the book is a good read and, as it is only 200 pages, could be knocked out during your flight to and from the Annual Foray.

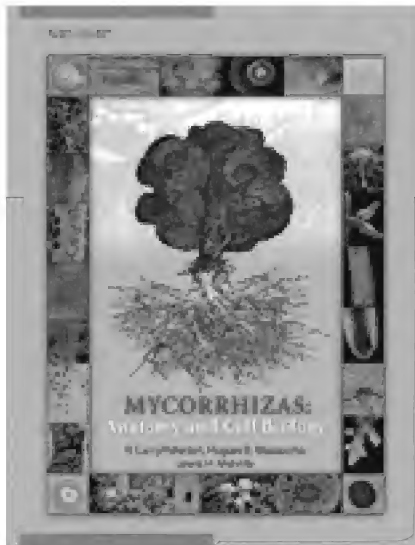
If anyone else has any mycophilic works of fiction to recommend, please bring them to my attention. Happy reading!—Britt

Mycorrhizas: Anatomy and Cell Biology, by R. Larry Peterson, Hugues B. Massicotte, and Lewis H. Melville. Ottawa, Ont.: National Research Council of Canada, 2004. 173 pages. ISBN 0-660-19087-7.

It seems as if just about everywhere in the plant world that researchers look, symbiotic associations are found involving a partner fungus. In fact, the current thinking is that the vast majority of plants—if not all of them—are involved with mycorrhizal fungi.

If you're pretty much a novice (like me) when it comes to an understanding of the mycorrhizal fungi, and if you're looking for a book that's not too long, is easy to read, is well organized, and has incredible color and black-and-white photos, then look no further. I can't say enough about how informative and downright beautiful this book is.

The text is divided into chapters discussing the different groups of mycorrhizal fungi, with each chapter divided into descriptive sections. The first section is always the Introduction which is further divided into three subsections: Definition, Plant Species Involved, and Fungal Species Involved. Other sections within each chapter can vary but usually feature descriptions of structures and physiology. "Functions" of structures—Hartig net, different types of spores, "hairy roots," arbuscules, how orchid mycorrhizae play a role in seed germination, etc.—are described with great clarity and plenty of illustrations and fantastic electron micrographs. Chapters are titled "Ectomycorrhizas," "Ectendomycorrhizas," "Arbuscular mycorrhizas," "Ericoid mycorrhizas," "Arbutoid mycorrhizas," "Monotropoid mycorrhizas," "Orchid mycorrhizas," and "Dark septate fungal endophytes." There is a complete list of references at the end, which I find very helpful



when learning about a new topic. Furthermore, the Appendices provides step-by-step details on how to stain plant root tissues to observe mycorrhizae under the microscope.

Although this book would make a superior text for college-level students, it's written with the clarity to be suitable for all mycophiles; but keep a copy of Ainsworth and Bisby's *Dictionary of Fungi* handy, just in case, as there are quite a few technical descriptions.

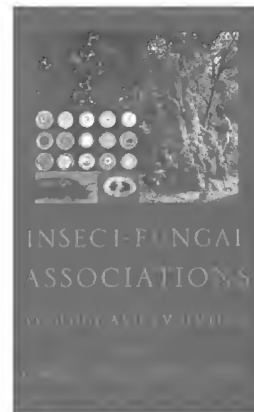
Insect-Fungal Associations: Ecology and Evolution, ed. by Fernando E. Vega and Meredith Blackwell. New York: Oxford University Press, 2005. ISBN 0-19-516652-3.

The majority of named species on the planet are insects (750,000 of about 1.5 million total, in all phyla). Fungi are pretty well known from just about every biome on the planet and have a knack for intertwining themselves (no pun intended) into the lives of countless other species. Despite these two facts, the interactions between insects and fungi have not been very well researched. I know from experience as the area has been of interest to me for many

years now, the interactions between mushrooms and mushroom-eating flies—those nasty maggots that always seem to spoil your basket of boletes or chanterelles!

This brand-new book summarizes what is known in the field and provides good overviews from several experts. Although there is no section on mushroom-arthropod coevolution, all the well-studied areas are covered. Probably of most interest to the mycophiles (and likely best understood) are the sections on fungus-farming termites and ants. The chapter covering the latter is entitled "A Comparison of Agriculture in Humans and in Fungus-growing Ants." Other chapters elucidate the ecology of mycophagous bark beetles and their fungal partners (morel season just ended; think Dutch elm disease here), how plants benefit from chemical defenses produced by their fungal endophytes, and several chapters on fungi that are parasites of insects and other arthropods. As alluded to elsewhere in this issue, you can't hear the name Meredith Blackwell without thinking about the yeast symbionts of arthropods and this topic gets ample discussion in two chapters.

For anyone wishing to find out more on how insects and fungi get along (and sometimes don't get along) in the environment, this book is a great place to start. Although aimed at the research community,



this book is certainly readable by anyone with a little background knowledge of modern fungal research. Besides, the stories are truly fascinating!

—Britt

False Witches Cap

by Steve Nelson

Caulorhiza (Collybia) hygrophoroides (Peck) Halling is uncommon enough that it is hard to find a lot of information on it, distinctive enough to be definitely recognizable, and well worth knowing about. It has a deep brick-red smooth (initially) conic cap that is weakly hygrophanous, rather broad off-white gills, and a reddish-tinged, longitudinally striate, twisted, solid, and tough stem that is strongly rooting. The spores are elliptical and amyloid, turning dark blue in Meltzer's solution. Peck noted that young specimens look rather like *Hygrophorus (Hygrocybe) conicus* and named and illustrated it accordingly in his Annual Report 32 (for 1878) from material found at Knowersville, Albany County, New York, which was repeated exactly in Annual Report 37 (for 1883, which was N.Y. State Museum Bulletin, Vol. 1 No. 2). Peck noted that it is exceptionally rare, and in his 49th annual report (for 1895), he notes that it had not been reported again in the 17 years since the initial find.

Kauffman (1918) provides a good description but only a very poor photograph of two aged specimens viewed from below the cap so only the striate stem may be seen well. He only had found it near Ann Arbor, Michigan (where he lived), and mentions that it is rare and local but "rather common in a single locality." He extends the period that it occurs from May to July and says that Peck saw and verified the identification of his specimens. Graham (1944) copies Kauffman's description and adds Illinois to the list of states in which it had been found (without locality). He also shows a line drawing, obviously copied from Kauffman's photograph with the addition of a suitably conical button.

Smith, Smith, and Weber (1979) give a more modern description of it, promote it to "infrequent" (which suggests to me that Smith knew at

least one place to find it regularly; he lived in Ann Arbor, too), but they curiously omit the fact that the spores are amyloid, which put me off its trail for a while; also, they do not show a drawing. Lincoff (1981) mentions that it grows in the spring but does not describe it. Thus this species has essentially disappeared from popular mushroom books after the advent of color photography made it an unattractive choice to carry many species (especially those that do not occur on the East and West coasts).



Caulorhiza hygrophoroides
Photographed by Steve Nelson at May 21,
2005, Wildcat Mountain State Park

The cap margin being straight on the stem when young (instead of curled under the rest of the cap) and its amyloid spores exclude it from modern *Collybia* (and Halling's segregates, *Gymnopus* and *Rhodocollybia*). Its closest relative is *C. umbonata* Peck (described in 1904), a similar but more common species that grows under Coastal Redwoods in the Pacific Northwest and was transferred to genus *Caulorhiza* by Lennox in 1979. Singer synonymized *Caulorhiza* with his genus *Hydropus*, although *Collybia hygrophoroides* Peck was neither transferred to it nor otherwise mentioned in the 1986 edition of his world-wide compendium of mushrooms. Halling transferred *hygrophoroides* to *Caulorhiza* in 1983 in a

list of excluded species of *Collybia* (although Lincoff already used the name in 1981). Halling deserves special praise for putting his *Collybia* monograph on the web (www.nybg.org/bsci/res/col), making this technical and difficult-to-find material available free, presumably seriously cutting into sales of hard copies.

Our experience agrees with the "rare and local but rather common in a single locality" comment of Kauffman. We discovered *C. hygrophoroides* in the Hemlock-Hardwoods Scientific Area near the top of Mount Pisgah, the highest hill in Wildcat Mountain State Park in Vernon County, Wisconsin, on May 15, 1999. It was an especially dry year, and we were trying to find morels (of course). Including then, we have found it during May in five of the seven years, between May 15th and 26th, sometimes but not always in what we believe to be exactly the same place (on the dogleg immediately uphill from the rock covered with walking-fern, so it is easily identifiable). All but one time it has been found appearing to arise from bare earth, although it doubtless occurs on buried wood, explaining its appearance in dry years. We have never found more than six caps at once, but it is surprisingly reliable in this limited area, much more so than the elusive morels, which have been found there about half the time. The only other time we have found *C. hygrophoroides* was during another very dry period on May 30, 1992, at Haskell-Noyes Woods. This is another Scientific Area that also is claimed to have never been logged, which probably explains the rarity of this species. Having found it several times, I feel justified in producing a "common name" for this most uncommon species.

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Mushrooms of the Month



This is a painting by Nancy Mladenoff entitled "Wisconsin 4." See inside this issue for more paintings and the story (page 1).